

AVIATION

The Oldest American Aeronautical Magazine

APRIL 25, 1927

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The record breaking Bellanca Monoplane (Wright Whirlwind) leaving Roosevelt Field

VOLUME
XXII

SPECIAL FEATURES

NUMBER
17

BELLANCA MONOPLANE SETS WORLD ENDURANCE RECORD
THE DEVELOPMENT OF THE AMPHIBIAN AIRPLANE
THE NEW YORK-PARIS FLIGHT PROJECTS

GARDNER PUBLISHING CO., Inc.
HIGHLAND, N. Y.
250 W. 57TH ST., NEW YORK

Entered as Second-Class Matter, Nov. 22, 1926, at the Post Office, at Highland, N. Y.
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The new design—able to deliver more than 1000 hp. at 2000 rpm. for work and speed. (See page 306.)

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With the Editor

The recent endurance flight of Pilsa Chamberlain and Annetta flying the Bellanca Monoplane resulting in the establishment of a new World record may, with reason, be looked at as the prelude to the setting up of other record breaking performances which will require for the United States some of the high international prestige which she feverishly held in international aeronautics. It is, in fact, not without significance that at the time the endurance flight was being made, a Navy job, flying a standard Navy plane, set up a new World altitude record for seaplanes with 500 lb. load.

That other outstanding performance will follow, cannot be certain. Encouraged by the endurance performance of the Bellanca plane, the sponsors of the flight rightly consider that this machine will have a very good chance of being able to compete the Atlantic flight from New York to Paris. The Bellanca plane is a single-engine machine. There is no other single-engine plane the reader and the editor of these pages across it will be the first single-engine airplane to make the Atlantic flight. Furthermore, since all the candidates for the Olympic prize intend to make the flight regardless of whether or not they are the first considerable experience will be amassed for it, must be remembered the proposed trans-Atlantic flight includes at least one two-engine and one three-engine machine in addition to these two single-engine planes and two four-engine who may attempt the flight.

Pan-American Flyers Reach Cuba

The Pan-American team, now in Cuba, are expected to make their official landing at Santiago May 3, at the opening of the All-American Aircraft Display. They will be escorted by planes from Langley Field and greeted by planes from Santiago. Secretary of War Dwight Davis, Assistant Secretary of War Herbert McKittrick, Assistant Secretary of War Aviation F. Trickett Devison, Major Gen. Charles P. Canineval and representatives from foreign governments, especially those included in the itinerary of the Pan-American flight, will meet the team when they land. Upon reaching Miami, the flyers will be met off the Florida coast by a group of Army planes, headed by Major Gen. Moses M. Peck.

On April 18 the planes left Port-de-France, Martinique, at 10 a.m., and arrived at Potosi-a-Vie, Island of Guadeloupe, one hour and fifteen minutes later. They flew from that city to St. Thomas, V. I., a distance of 265 mi., in three hours and 31 min. They were entertained during the afternoon by Governor Evans and a dinner was held in their honor that night.

The eighty mile trip between St. Thomas and San Juan, Porto Rico, was made in one hour on April 18. The city gave a dinner in honor of the team. They arrived in Santa Domingo, D. R., at 11:25 a.m., April 18. The distance between San Juan and Santa Domingo is 250 mi.

Lubrication of Duration Record Plane

Proper lubrication of the Wright Whirlwind 330 hp. engine contributed greatly, to the success of Pinta Chaudhury and Asanta, to the 51 hr. 11 min. 26 sec. duration record of the Bellanca monoplaner. It is of interest to note that of the 17 odd gallons of Pennwalt taken on for the flight only 4.31 gallons were consumed.

Looning Talks To Dargue Long Distance

As this issue goes to press, we learn that on the morning of April 26, Greener Looning, of New York, talked over the telephone to Mayor Herbert Dargue, Commissioner of the Pan-American flight squadron of four Looning Amphibians, St. St. Thomas, Cuba, and discussed many of the details of the flight. The planes reached Havana April 18.

Vought Corsair Sets Altitude Record

WHAT WILL, with little doubt, be recognized by the Fédération Aéronautique Internationale as a new World record was the altitude performance set up on the afternoon of April 13 by Jack George R. Henderson, U. S. N., flying a Vought Corsair, one of the Navy's latest biplanes. Ascending planes for shipboard use. Carrying a useful load of 500 kg. (1102.3 lb.) the machine reached an altitude of 24,520 ft., according to the records of the two inch-film photography which were carried on the flight.

While, upon completion of these instruments, the recorded altitude may possibly be expected to be reduced somewhat, even possibly to the extent of 1,000 ft., this will still leave a wide margin over the former World altitude record for airplanes carrying 500 kg. The present recognized record is the 500 kg. world record held by the Italian pilot, A. Prino, who, on Dec. 25, 1924, flew a Savoia Marchetti S. 59 ses-

plane, equipped with a 550 hp. Bristol Pegasus engine, to an altitude of 29,280 ft. This flight was made at Santa Catalina (San Mateo), Italy.

Endorsed Henderson took off at the Annapolis Naval Air Station at 3:30 p.m. and soon reached an altitude of 15,000 ft. at which height he put on his oxygen apparatus and sustained climbing. The engine functioned perfectly throughout the entire flight, in spite of the fact that a temperature of 8 deg. below zero was maintained at the maximum altitude. The flight concluded at 4:45 p.m., when a landing was again made at the Naval Air Station.

Lieutenant Henderson's flight was witnessed by Foster Adams, president of the National Aeronautics Association, who officially represented the F. A. I. and personally took charge of the photography at the conclusion of the flight and arranged for their collection by the Bureau of Aeronautics.

The Corsair manufactured by the Chance Vought Corporation, East Hartford, Ct., is a new standard requirement by the Navy and is used for shipboard flying from sea-paths on battleships and cruisers at sea. The so-called "zip" engine in its standard power plant equipment and the plane in which the altitude flight was made was a carrier type in every way, an ideal arrangement for the flight having been made over the engine room with a representative.



Left, George R. Henderson, U. S. N., flying the Vought Corsair, set the new altitude record.



The Western Pacific (John Whitehead) outgassing test at Satal, Pa.

John Whitehead

The New York-Paris Flight Projects

Many Plan Trans-Atlantic Flight This Summer.
Davis Plane Undergoes Successful Flight Test

THE ANNOUNCEMENTS of several proposed trans-Atlantic flights for the upcoming flying season of 1927, which have been current in the press during past months, have now taken definite form and the next few weeks will probably find at least two of the projects actually under way on the New York-Paris flight.

Lieut. George R. Henderson, U. S. N., is working towards an early start, like three-engine biplane, "The American Legion," manufactured by the Keystone Aircraft Corporation, Bristol, Pa., has already undergone successful flight tests, and has been flown from Bristol in Washington, and from this latter city to Langley Field. Command. Richard E. Byrd's Public three-engine plane is nearing completion, and Commander Byrd has announced that he will make the flight regardless of any other flight completing the flight before him.

Others who have announced their intention of attempting the trans-Atlantic flight are Charles A. Lindbergh, Hans Bock and Capt. Charles Nungesser. It is thought that Clarence Chamberlin and Bert Asanta will also join the competition for the same amazing wing the Bellanca monoplaner, in which they broke the endurance record last week. Charles A. Lindbergh, who is now a test pilot on the route between Chicago and St. Louis, will use a Ryan monoplane, powered with a Wright J-5 Whirlwind engine. His plane is now being assembled for a test flight between San Diego and St.

Louis. Captain French will make his attempt this year with a Silently biplane, equipped with two Gnome Rhone Jupiter engines. Capt. Charles Nungesser, who will attempt the flight with Lieut. Francis Cobb, will use a Levasseur, with a 500 hp. Lorraine-Dietrich engine. Captain Nungesser will compete also for the French prize, in which he must use a French plane and French engine.

The American Legion, which is powered with two Wright J-5 Whirlwind 330 hp. engines, has two of the engines mounted on the lower wing, while the third is installed in the nose of the fuselage. The wing engine assemblies are well staggered and fixed into the fuselage. In construction, the fuselage, engine section and wing struts to the engine section are of welded steel tubing. The wings which have a high-220 section are of the usual wood construction, employing box beam and fabric covered wooden ribs. The wing span is 67 ft. and the wings are not without slugs. The main fuel tank which is situated in the rear of the pilot's cockpit, is a brass tank of 800 gal. capacity, and said to be the largest gasoline tank ever carried in an airplane. It is also has accumulated the provision of large splash plates to prevent sudden shifting of the fuel. These tanks, situated in the upper wing, have a capacity of 500 gal. and a third can, under the pilot's seat, holds 100 gal. This gives a total fuel capacity of 1,500 gal., making cruising radius of 4,500 mi.



The Sikorsky P-43 Hawk (Right Winged Warhead)

Photo International Newsphoto

possible—600 in. more than necessary. The main tank carries two large hand operated fuel pumps, and auxiliary pump for forcing fuel into the main tank into the gravity tanks in the upper wing. The main tank can be emptied in sixty seconds. It is connected to a cylinder of liquid carbon dioxide, which, on expanding, would fill the tank and keep the plane aloft on the water if necessary.

The pilot's cockpit, which is in front of the main tank, is equipped with a modern radio-compass and control. This consists of a single control that can be shifted from side to side in front of either seat. Over the main fuel tank is a cockpit, outside the plane, containing the pilot's cockpit and the navigation compartment, behind the tank. In this compartment are fuel pumps, radio apparatus, electric light and a control mechanism for the engine, a fuel tank, battery, etc.

A Cutback Along the Fuselage

In taking recent readings, it will be necessary for the navigator to cross the Atlantic very late. The aircraft has two fuel tanks and a central wing, with a safety valve may be induced to provide reserve being placed on-board. Commander Dorn will use a new type aircraft, employing an artificial horizon. The radio apparatus is especially built for the plane. It includes a short wave transmitter and a long-wave receiver with a radius of about 1,000 mi. Weather reports will be sent and received every hour during the flight. The shock absorbers on the landing gear are very heavy, a special also constructed being used. The tail skin, which is flexible, is (flexible) equipped with also gas. The plane

has double engines, belated rubber and belated elevator. The elevator is adjustable, so that under varying load conditions, the attitude of the plane may be preserved without a strain on the pilot. The tail fin is also adjustable in order that compensation may be provided if one engine is cut out. In the successful flight test, which the plane underwent on April 3, it carried a useful load of 1,000 lb. The speed was over 120 m.p.h., and the plane flew well on two engines, with no one stopped.

Details of the Plane

The American Legion is now being tested at Langley Field, Va., from where it will go to Norfolk Field, Va., for the first preparation for the flight. The specifications of the plane are:

Wing Span	67 ft.
Length	44 ft. 10 in.
Wing Area	1,550 sq. ft.
Weight Empty	5,875 lb.
Weight Loaded	16,000 lb.
Engines	3 Wright J-5 Whirlwinds, 23 Whirlwinds, 160 hp
Power loading	33 lb. hp
Maximum speed	300 m.p.h.
Landing speed	90 m.p.h.
Rate of climb	500 ft. per min.
Range	4,200 mi.
Endurance	approx. 50 hr.

The plane which Commander Dorn will use has been called the "American", and is similar to the one in which he flew to the North Pole. His flight is sponsored and financed



Photo International Newsphoto

A side view of the Sikorsky P-43 Hawk (Right Winged Warhead) in which Commander Dorn will attempt the Atlantic flight.

by the American Times-Occident Company, of which Holmes Weisner is president. On the flight, Commander Dorn and Pilot Dorn will be accompanied by James George D. Smith, who is well known as an authority on navigation problems of aircraft engines. Commander Dorn has announced that his flight is not for the day of the day, but is intended to be a demonstration and an aid in the general advancement of aviation.

The American is being built by the Sikorsky Aircraft Company, of Easthampton, N. J. It will have a welded steel fuselage with a plywood covered, wood construction, metal wing and three J-5 Wright Whirlwind engines, with which it will be powered, will be situated one below each wing and the third in the nose of the fuselage. There is to be a cutback from the fuselage to each of the outboard engines. This cutback has been designed so as to provide some lift and of the same size inside the fuselage to adjust a wing engine in flight. A safety belt will be worn by the mechanic climbing out to make a repair.

The main tank of 800 gal. is not built as an integral part of the fuselage but is suspended in the fuselage from the wing spars. There are also other tanks of 30 gal. each in the wing. Back of the main tank, in the fuselage, is a reserve tank of 100 gal. Its fuel lines a reserve tank can be supplied and control from the fuselage. A total of 1,500 gal. can be carried, as compared with 1,000 gal. to be carried by Commander Dorn's plane. The pilot's seat is placed further forward than in the plane Commander Dorn flew last year. Dual side by side control is provided and back of the pilot's seat is a compartment to be used as a navigation room where the radio apparatus is fitted.

In a space behind the wing, at the top of the fuselage, are two radio-compass units, magnetic compass, waterproof direction, etc. The general details of the plane are:

Wing Span	67 ft.
Length	44 ft.
Weight empty	5,875 lb.
Weight loaded	16,000 lb.
Engines	3 Wright J-5 Whirlwinds, 160 hp
Power loading	33 lb. hp

At the moment of going to press, no plans were great extent of the work which will be the first successful test flight of the machine was landing after a very successful test flight at Easthampton, N. J., on April 16. No complete details were given in the plane and the airplane are expected to make a successful voyage, Dorn Dorn who continued the greatest journey in said to be progressing satisfactorily. The incident, however, has not yet been the plane for Commander Dorn's journey.



Continued on page 826 of the Aviation



Three men, including the Sikorsky P-43 Hawk, are shown in the photo. The man in the center is Commander Dorn, the man on the left is Pilot Dorn, and the man on the right is James George D. Smith.

Three men, including the Sikorsky P-43 Hawk, are shown in the photo. The man in the center is Commander Dorn, the man on the left is Pilot Dorn, and the man on the right is James George D. Smith.

The Sikorsky Manufacturing Company is building a two-engine plane designed to be equipped with two 400 hp. Gnome Rhone engines for model engines. With a normal load of 7,000 lb., the plane will be able to fly on one engine. It is expected that the plane will be ready in June of this year. The Sikorsky Corporation is not making any part in the organization of the proposed flight of Captain Focke from New York to Peru except the building of the plane. The flight will be entirely managed by the American and German Aeronautical Corporation and Captain Focke.

With a top speed of 150 m.p.h. and normal climb rate, it is expected that the plane will have an average speed on a flight of 4,000 miles of about 100 to 180 m.p.h. The plane will be of all-metal construction, fabric covered, the entire structure of the wings and fuselage being built out of aluminum channels and angles.

It is expected that the plane, before the attempt to fly to Peru is made, will be thoroughly tested and demonstrated in the country including every necessary detail on the flight to Peru except possibly take place before the second part of the actual journey. It is not considered, therefore, that Captain Focke's flight will be serious in its competition with the other planes.

American To Go With Focke

Captain Focke is anxious to preserve the international status of his New York-Peru attempt and for this reason has maintained his desire to fly an American plane equipped with French engines and it is probable that he will be accompanied by an American crew as well.

As was the case last year, the plane now being built for Captain Focke is not a machine specially designed as last year's three-engine plane but is a type of machine developed by the Sikorsky Corporation for long distance commercial and military flights. The difference between the plane which Captain Focke intends to use in his trans-Atlantic flight and the shock planes of the main type will be the larger fuel tanks and the installation of certain additional navigation instruments.

Ford Transport Has Successful Year

In the year ending Feb. 15, 1927, the Ford Air Transport planes carried 5,593 lbs. of air mail between Detroit, Cleveland and Chicago. This was the first year of operation under the mail contract. In the first twelve months the Ford planes carried 1,967,114 lbs. of Ford Motor Co. freight between Detroit and Chicago, the equivalent of about twenty-two thousand freight car loads.

During the year 636 flights between Detroit and Chicago were scheduled, of which 501, or 78.6 per cent, were completed. There were 559 flights between Detroit and Cleveland, of which 503, or 90.3 per cent, were completed. The year's flying 128,598 miles in the Chicago service and 123,350 miles in the Cleveland service, brought the total Ford line mileage since the company entered service, April 13, 1925, to 524,369 miles. Since the beginning of scheduled flights, 2,629 have been completed, or 91.3 per cent.

Tandem Propeller Successfully Tested

Successful flight tests were conducted at Garden Field on March 15, 1927, on a novel tandem type of Curtiss-Hendall propeller, designed by Dr. S. A. Hendall. This propeller is the equivalent of a four-bladed propeller and it made up from two single-bladed propellers of the Curtiss-Hendall type. These are mounted on the same hub, instead of at right angles to one another, as is usually the case. This unique arrangement provides a four-bladed propeller of compact design which is easier to crank and much easier and cheaper to change than the usual four-bladed type.



As far as can be ascertained, this is the pioneer four-bladed propeller in the world. It is still felt that construction was brought out more easily with tandem propellers but was evidently not found of practical importance.

The test propeller, which has been designated as type "B", has a diameter of 5 ft. 1 in., with the blades spaced 1 ft. apart. Through the courtesy of Richard H. Dugan, now president, Fairchild Flying Corp., it was flight tested on a Fairchild monoplane powered with the Wright Whirlwind engine, and showed a performance superior to that of the standard two-bladed propeller used on the same airplane. The test propeller has also been exhibited at McCook Field with satisfactory results.

To Gather Aviation Memorabilia

The American Society for the Promotion of Aviation appointed a committee at its last meeting to undertake the work of collecting data and photographs of the planes that have given their lives in aviation to all branches of the U. S. Air Service.

It is planned to have various interests sponsor the presentation of memorabilia, similar to the plans of General Roosevelt, now hanging in the Roosevelt Hotel. Until the time when a definite location has been obtained for the exhibits, the memorabilia will be displayed on the memorabilia of the Roosevelt Hotel.

Wine Merchant Uses Airships

Paul Orpan, Persian wine manufacturer, an employing native business to advertise his product and give it broad publicity. One of these is conducted on ships of the brand in which the wine is sold.

The Continental Single Sleeve Valve Engine

The single sleeve valve airplane engine, designed by the Continental Motors Corporation, of Detroit, Mich., and introduced for the first time at both the New York and Chicago Automobile shows, at the first of these exhibitions was found to be seen in this country. The engine is a new cylinder, radial type with six in. bore and 5 1/2 in. stroke, developing 529 hp. at 1,800 r.p.m. The engine has a displacement of 777.2 cu. in. and weighs 470 lb.

The single sleeve engine, as developed by the Continental Motors Corporation, is only one of a series of such engines it is intended to design before it will be ready for production. The engine is a new cylinder, radial type with six in. bore and 5 1/2 in. stroke, developing 529 hp. at 1,800 r.p.m. The engine has a displacement of 777.2 cu. in. and weighs 470 lb.



The Continental Motors single sleeve valve airplane engine.

Geodrich Develops Lightplane Tire

The recent development of the 35 x 3 in. airplane tire, for straight-tube tires, by the B. F. Geodrich Rubber Company, will be well received by lightplane enthusiasts. The construction of this development by the Geodrich Company follows some after the new 36 x 4 in. tire is available.



The new Geodrich 35 x 3 in. airplane tire is suitable for light plane tires as well as for the airplane tire.

Genoa-Buenos Aires Flight

Edouard Givens, an Argentine pilot, is planning a flight from Genoa, Italy, to Buenos Aires, A. R., a distance of 7,800 miles, making only two stops en route. He will use a Service flying boat, fitted with two Napier Lion engines. The machine is now under construction in Italy.

The pilot is making the first leg from Genoa to Dakar, Senegal, a distance of 2,800 miles and from Dakar across the South Atlantic Ocean to Pernambuco, 2,200 miles, and from there to Buenos Aires, 2,800 miles. He will have in his company on the flight Bernard Dumas, who last January flew from New York to Buenos Aires.

Detroit-Grand Rapids Airline Pioneers Passenger Transport

Proves Passenger Air Transportation Feasible. Frequency of Service an Important Factor

By B. RUSSELL SHAW

IT IS AN accepted fact that it costs more per mile to operate an airplane on an airline than it does a privately owned machine. The reason for this extra cost is obviously the greater care cost that has to take into consideration the many costs connected with the operation of a commercial airline. These costs may, for the most part, be broken down into costs, being, in other words, the expense in connection with necessary passengers, maintenance of fields, often charges, etc. The cost of operating the airline itself, in general, is covered, the pilot, flying mechanics, staff, warehouse, maintenance, depreciation and interest on the investment.

Short Route Problems

William B. Short has summed up in a short sentence the difficulties of a commercial airline as being one which can support itself on the air financially as well as mechanically. The costs per mile for operating any vehicle can be reduced by keeping that vehicle in operation as long as possible. As possible. Short has difficulties cannot possibly appear efficiency from their viewpoint unless they use a small number of planes and make up for this expense by increasing the number of trips which, on short routes, will keep the airplane in the air for a greater number of hours.

It is obvious that in governing an airline, particularly in commercial which are not air-rail, there is a great amount of expense which is not required to operate. To the passenger operators and particularly in the lack of such operators should go a tremendous amount of credit, for they are making it easier to advance aviation by virtue of the financial expansion.

It is interesting to consider by this connection that at the opening of the Detroit-Grand Rapids Airline, the latter named only had one but light commercial activity. To the population a general airplane was fitted into the trunk which had no visible means of support. For the most part, the airlines were afraid of the airplane. The subscription to Short Air Service, Inc., however, was because of seeing it as an airline could be successfully operated and the results, while not exactly satisfactory from a financial point of view, have been very satisfactory from the standpoint of aviation as an advancement.

The cost of operating a short line of only 142 miles in commercial, particularly when the subscription is looking at the personnel, to make possible a gross profit to enable contemplated extension of the line. Furthermore, the cost of obtaining passengers is much more expensive than it would have been had the City of Grand Rapids been able to do the safety and reliability of commercial air transportation.

The Traffic

In order to maintain the amount of the investment and to satisfy themselves as to the profitability of the project, proposed Short Air Service began operations with one single-engine Wright-Whirlwind biplane, powered with a 400 hp. Liberty engine. Three round trip per week began with the opening of the line on July 21, 1926. The program was continued until Oct. 1, at which time a scheduled trip schedule was started. On March 25, 1927, a total of 3,000 passengers had been carried. The total traffic weight carried in the first seven months was \$51,628. There were 399

scheduled trips, of which 279 were completed, or a percentage of 96.67, with a total of 40,150 miles were flown. During the seven months of operation but one intermediate landing was made and this was due to the fact that the pilot, the day in a heavy storm. The balance of the unscheduled trips were scheduled because of the weather conditions, generally caused by heavy fog. It is of further interest to note that during this time no repairs, other than the replacement of a shock absorber and a control cable, have been made to the single plane with which the service is operated.

At the beginning of operations it was difficult to sell passenger air transportation because of the public fear. However, with the regular operation of the line, without accident, this fear has gradually disappeared and the airline is rapidly being accepted as a commercial means of rapid transportation.

At the time the Detroit-Grand Rapids Airline was opened, an arbitrary passenger charge of \$3.00 for day-way and \$4.00 for the round trip was made. In addition to this, commutation tickets containing tickets for one week, were sold for \$10.00 each. In order to reduce the great difference between the price of the basic ticket and the single and round-trip rates, a revenue as the price was made, bringing the single rate ticket to \$1.80 and the round trip ticket to \$2.50. In each instance, these prices include the variable transportation from the hotel to the airport and the airport to the hotel.

Experimenting With Rates

While the reduced rate was not justified from an operating standpoint, it was done primarily to attract traffic. It was further believed to find that this reduction did not bring an increase in traffic. There may be several reasons for this. It is possible that the rate may be considered too high by the average man and that it has only been reduced to bring the higher scheduled schedule. On March 1, a flat rate of \$16.00 became effective. This brought the revenue amount from a large number. If the line were longer, or if more round trips could be made, the revenue could be reduced, adjusted relations could be passed along to the public. At the present time the line is carrying approximately one percent of the total passengers carried between Grand Rapids and Detroit.

The Grand Rapids Terminal

The steady, constant operation of the Detroit-Grand Rapids Airline has done much to result in the needs of the public the reliability and safety of commercial air transportation. Grand Rapids has profited by having one of the most modern and complete airports in the United States. A large two-story administration building provides ample accommodations for passengers, and offices of the Grand Rapids branch of Short Air Service, Inc. The grounds are kept in perfect condition and various other air service features. The business men of Grand Rapids are beginning to see the service more and more as a business asset. The Grand Rapids Aero Club is behind a new definite program to attract the city to the advantages of commercial air service, and they hope not to let Grand Rapids in the air map but to make the city the "Most Air Serviceable City in Michigan."



Wheeler's Dixie flies with the Dixie. It is the first airplane to fly with the Dixie.

only appeared the Dixie to find the entire airplane represented merely a change in development, that of adding wheels to a monoplane.

It was the experimental work, however, which showed the interest of the Landing monoplane and work was started on the design of the plane which is now known as the Landing Amphibian. Difficulties were met and, however, Mr. Leaning's plan involved the use of an inverted engine and although he had suggested such a development to McCook Field as early as 1923, no such engine was then available. Mr. Leaning has long contended that because the automobile internal combustion engine has the combustion under the cylinder, this should be its reason for adopting the same principle to standard in aeronautical engines. In the automobile, in fact, where it is essential to keep the driving shaft as low as possible, the adopted position is found but in the case of the airplane the requirements are diametrically opposite and it is the more reasonable that aircraft engines should incorporate the high combustion possible only in what has become known as the "inverted" engine.

Some European Amphibians

About the same time that this experimental work was going on, Mr. Leaning pointed out in his address, the Duxbury Wright Company built a very interesting amphibian for the Navy, to the design of Col. V. E. Clark. While that was a most practical machine in every way, and did a considerable amount of flying, it still possessed the actual disadvantages of a monoplane fitted with wheels. The European designers, also were giving an active attention to the possibilities of amphibian aircraft and the first real step forward after the American was the development of the Vickers Vimy. This machine, too, however, represented a normal form of flying boat with retractable undercarriage. The type, quite apart from its neighborhood, does not lend itself to successful diversions in view of the high position of the engine with the pusher propeller and the greatly increased drag of the entire structure.

A similar machine, known as the Sea Gull, was produced by the Government Aviation Works, another British firm, and seemed almost place in the Air Ministry's amphibian competition in 1926 losing first prize to the Vickers Vimy. The Government Sea Gull has been used widely and well in England but also in Japan. The machine was a most fine boat with wheel attachment.

Another fine boat type of amphibian developed in Europe is the French Salmson V.B.A. 21 which was exhibited at the



The French Salmson V.B.A. 21 which was exhibited at the 1926.

Paris Aero Show late last year. The machine is a four plane semi conventional flying boat equipped with a greater propeller driven by a 500 hp. four-cylinder Hispano-Born engine mounted behind the wings. The wheels fold up under the fuselage when water alighting is to be made. The plane like most other amphibians types, cannot, however, be taken up in a wet amphibious development since the wheel undercarriage was added to the design purely as an "after thought" and is not even fitted with shock absorbers. The gear is apparently satisfactory in a moment, but the landing is very nervous and the only shock absorption is in the tire flexing.

In Europe too, considerable attention has been given to the problem type of amphibian. Particularly in England, in this type of machine, the French firm Potez has been having excellent considerable success in dock landing amphibians in the British Navy. But, as has already been mentioned, all these machines, almost without exception, represent



The first machine capable of amphibian type developed in America. The flying machine is the first.

not pure possibilities of airplanes and amphibians and cannot be regarded as genuine amphibian developments. In general the planes are neither good airplanes nor good amphibians and are severely difficult to handle on the ground. Consequently, it was not until 1921, when the first Landing Amphibian was built, that we had an airplane which was a genuine amphibian development resulting in a machine which had flying qualities equal to those of airplanes and amphibians in the same type class and was as equally at home on the water as on land.

Disadvantages of Early Types

Summarizing the disadvantages of the general amphibian development up until this time, Mr. Leaning has emphasized the following points regarding the general type of amphibian:

1. Poor flying qualities. Slower and heavier handling in a monoplane and more head resistance in the air and on the water, due to the external attachment of the landing gear.
2. Disposition in land operation, particularly in the flying boat type of amphibian in which the engine is over the crew. The wide distribution of heavy weights, with the gear located in the bow of the airplane, constitutes a distinct menace over land. To add to this, the propeller at the rear is a danger, and the weight being very much higher off the ground, leads to difficulty in handling.
3. The original amphibious construction did not give any actual advantage either to the land or the sea plane type.
4. Poor efficiency and maintenance, and, therefore, highly expensive operation and low performance.



The Landing Amphibian of 1921. The amphibian was conceived with wheels and was produced by the Dixie of Dixie.

This was the situation when the Landing Amphibian was conceived. The purpose was to work on the problem. Late in 1925, however, McCook Field purchased the machine of the Liberty D-1 engine, the prototype of the Landing Amphibian with the type of power plant in which he had been looking for years. The design, which was evolved from entirely new and the Air Service, as it was then, found it difficult to grasp the possibilities of this new design. In 1925, however, the first experimental model was constructed and made tests under the machine had been built. In January, 1926, Lieutenant Braddock accepted the first Landing Amphibian to be produced for service, hence one of a group is to be constructed for the Army.

Superiority in Performance

Mr. Leaning had made some very definite claims for the machine and it was this first plane which demonstrated for the first time that his conception were based upon good reasoning. With the usual power plant as in an Army D-1 observation machine, the Landing Amphibian, with 260 to 280 lb. additional weight, was able to out-fly, out-climb, out-maneuver and was out-paced the D-1 observation plane, at the same time being capable of functioning equally well as a seaplane. Since then, about every Landing Amphibian has been built for both service and within the course of the past two years, these machines have been service in a multitude of different phases. This, has been one of the most important factors in the development of the Landing Amphibian. The machine has been used in a multitude of different phases. This, has been one of the most important factors in the development of the Landing Amphibian.

Four flying qualities have been obtained by adopting the ordinary type of fuselage layout in which, however, the use of the inverted type of engine and by the careful distribution of weights, the center of gravity, and the center of lift, the air is brought to a state of equilibrium as possible. The first one that being to the great depth of the Amphibian body, the machine would be very uncomfortable to fly, were in making turns a real sense of gravity may tend to be avoided, a plane while an extremely large fly area too for before the center of gravity may tend to "hunch" a plane when it dips

backward in turns. These difficulties were, however, considerably obviated or eased as a result of extensive experimental work which established the accuracy for a standard CG, with C.G. at the air line.

Stability and Economy of Design

The design of the Landing Amphibian has created essentially in securing a true airplane into a flying boat by inverting the engine and building the fuselage in a boat-like form. There is no increased weight of weight in displacement in the design, and even the weight of the external part of the fuselage, the struts and the small struts, in fact, in the design of the body, amounts only to about 100 lb., all the interior ballast being required in any case as part of the support of the airplane on the ground.

The greatest practical advantage to the machine has been found to be the extraordinary amount of room in the hull



CC S.A.M. New York. The Duxbury Wright amphibian delivered to the U.S. Navy in 1926.

body and hull. The Landing Amphibian has been loaded and upon and stands in a capacity similar manner and as easily as the best land airplane of equal weight.

Among the interesting and important constructional details mention should be made of the elevator operation of the landing gear, which takes only 5 or 6 sec. to pull up or lower, and the hull construction which is entirely metal-covered throughout, using duralumin, fastened by duralumin bolts to wooden stringers, giving a remarkable anti-rattle and extremely quiet flight, even, however, in taking to water the duralumin sheet and the usual by a layer of fabric impregnated with bituminous. The use of bolts instead of rivets or wood screws is the result of a very careful study and is



One of the Liberty engine Landing Amphibians in use by the Coast Guard.



One of the Loening Amphibian planes (General Liberty) used by the Navy in the Albatross survey last year.

particularly desirable in that it makes the protection of the hull against corrosion in salt water much easier, because each individual hull can receive numerous coatings of special or aluminum, if desired and, in being fastened to the hull, it is not loosened like a steel nail, therefore, is not likely to lose its fastenings against corrosion. Up to now, only one sort of aluminum has been used on the Navy's Amphibians that were five months out at sea with the Navy's Arctic Unit and subjected to severe weather conditions, came back in remarkably good condition. The wood frame seems to have enough resistance to take up the severe handling of the load operation of the plane to prevent leaks from developing, which has always been a serious cause of trouble in amphibians.

The wing structure is metal (aluminum), covered with fabric. The ribs are made of duralumin by a machine-tool process, specially developed in the Loening shops. The spanned ribs give compressive rigidity and performance for several types of amphibians. From this it will be seen that, although an alloy factor is considerably higher than that of any of the airplanes listed, the Loening Amphibian at 50 or 15 per cent lighter than any of the other types, none of which, however, are built in any way of metal construction.

The Loening Amphibian has been used extensively by both the Army and the Navy, and, in every case the work for which the American Navy chooses this plane has generally been considerably heavy, which has resulted in the machines becoming known as the plane which does the hard work for the service.

The last really outstanding project for which the Loening Amphibian was chosen was with the Muffins Expedition in 1935 when the Naval Arctic Unit, under the leadership

of Comdr. Richard H. Byrd, consisted of three Loening Amphibians with aerial liberty engines. During last twelve flying days we flew three 4,000 miles of the most dangerous and difficult flying ever, covered and over the Arctic wastes without untoward incident.

Three similar machines were used last year in the Navy's photographic survey of Alaska under the command of Lieut. R. H. Wyatt. These planes covered a total of 59,000 miles without accident or failure of any kind. Also, last year, the Navy dispatched two Loening Amphibians to Cuba to take part in the hydrographic-survey operations. The plane has become such an integral part of the Navy's western operations that Amphibians now go in, as with the fleet, take-off and land on the deck of the U.S.S. Langley and have been dispatched from ships at sea—the Loening Amphibian being the latest plane to have operated from a ship's deck. The Coast Guard, likewise, employs Loening Amphibians.

The latest and most outstanding undertaking involving the employment of Loening Amphibians is the Air Corps Goodwill Flight of five planes around Central and South America. Under the command of Major Herbert A. Dwyer, the flight squadron of Amphibians with aerial liberty engines, left San Antonio on Dec. 22, 1936, on the flight of over 12,000 miles over land and water, covering and pilot, an undertaking which would have been impossible with any other type of plane, having it used in the comparatively small amount of ground operation carried out in advance.

At the moment of going to press the mail have reached Potosi-Pérez, Bolí, having approximately only 2,435 miles further to fly before the conclusion of their great flight.

A comparison of the general characteristics of some of the amphibian airplanes discussed in this issue is given in the following table:

Airplane	Engine Type	Power, Hp	Arm, Lbs.	Span, Ft.	Weight Empty, Lbs.	Max. load, Lbs.	Weight per sq. ft. Horiz. power.		High Speed, M.P.H.	Steepest Climb, Ft.
							Lib.	Lib.		
Sperry Triplane	Liberty 12	500	375	44	4,400	2,245	8.544	15.0	40	15,000
Phony	Wright Lion	250	455	44	3,600	2,600	5.250	12.7	11.3	10,000
Wright IV	Wright Lion	425	525	59	4,000	1,700	5.750	12.5	9.1	10,000
Bi-Plane	Wright Lion	150	504	45	4,175	1,275	6.800	13.2	10.0	10,000
Bi-Plane	Liberty	425	525	47	4,150	1,800	6.540	13.5	11.3	10,000
Loening Amphibian	Liberty	400	504	45	3,400	1,500	5.890	13.4	10.3	15,000

A wide appreciation of whatever the Loening Amphibian may have contributed to the Army, encourages the organization that created this product to continue earnestly its efforts to advance American Aviation.

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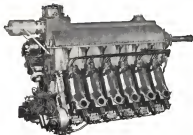


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3. The Loening Amphibian is the largest airplane to have been converted into a seaplane in the U. S. Navy. It is the only one which has been converted into a seaplane in the U. S. Navy. It is the only one which has been converted into a seaplane in the U. S. Navy.

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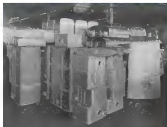
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In writing to these advertisers please mention AVIATION —
Loening Color Section.

Can The Control of Airplanes be Simplified?

Lock of Constant Relationship Between Position of Controls Complicates Flying for Private Owner

BROADLY speaking, there are two primary factors which have an important bearing upon the development of civil flying, the first of which is the question of cost and the second, safety. In regular air transportation, especially in the matter of cost and freight carrying, safety has at least been reduced to reasonable terms and relative operations have been found to yield reliability and safety in operation in a measure which is comparable with those found in other recognized forms of transportation. Cost, in fact, is the outstanding obstacle to the development of commercial air transportation.

In that domain of civil aviation which possesses a wide use of the airplane primarily for sport and pleasure, the problem takes on a different aspect and safety becomes more of an outstanding problem than cost, not because of the fact that the private sport type of airplane is in reality very low priced when in the commercial air line, but because it is in general going to be handled by less experienced hands. The purchasing cost of the most expensive available for private ownership is very low and very readily in excess of that of a good pleasure automobile, and with increased production, this cost will, without doubt, drop considerably. Yet in the operating cost of the light airplane is high. In many respects, in fact, running costs of the airplane are lower than those of the pleasure automobile. But danger—danger of accident based upon a certain amount of legitimate evidence—that is the great missing factor.

Errors of Judgment

Competent authorities have stated that it is in reality very few of aviation accidents can be ascribed to errors of judgment on the part of the pilot. Upon analysis, this means that, but the airplane involved in any particular accident back under the pilotage of one whose judgment and use of the controls was perfect, the particular accident would never have happened.

Thus being the case, accidents may best be avoided either by making better pilots or by developing airplanes, the controls of which are so simple that judgment and the danger into the problem of piloting is to great a degree. In the case of the automobile, this has been done. The control of an automobile is comparatively speaking simple and while judgment plays its part in making a successful driver, one who there is an accident is generally responsible, driving does not demand an abnormally high degree of judgment. It is reasonable to suppose, therefore, that accidents in judgment in flying will decrease in proportion as the control of airplanes is simplified.

With little doubt the greatest contribution towards lowering the safety in flying has been the development of controls which respond naturally over a wider flight range than was previously the case, more precisely, controls which function respectively of the position as attitude of the machine and provide a continuous reference over the shifting attitude of the plane. This has been achieved only after years of study of the design of aircraft, the functions and dynamics of control surfaces, etc., etc., all of which has resulted in the development of airplanes in the nature of which little further improvement can be anticipated unless radical and basic changes in principle are made.

The problem, however, is not purely aerodynamic. There is the psychological aspect which is perhaps of even greater importance. There are some very outstanding elements in the control of an airplane which seriously complicate piloting from the standpoint of the average pilot. In the case of an automobile, when the steering wheel is turned, the car starts to travel in the direction set and the wheel is returned to its original position. In the case of an airplane, however,

the conditions are entirely different. The rudder and ailerons may be set for a certain order of turn, but, if they are maintained in the original position, the path of the machine will soon take an increasingly sharp and dangerous spiral. Again the machine has been studied in the most exhaustive manner, and it is found to require a constant order of turn, it is necessary for the pilot to return the controls toward the original position as time lapsed, and every airplane varies in this respect.

Present System Complicated

This lack of constant relationship between the position of the controls and the path of the plane is a matter which makes flying seem complicated thus driving an automobile. In the first few feet of the turn, the position of the stick and the rate of rise or fall of the plane are entirely unrelated. The motion is further complicated by the fact that the longitudinal position of the plane, with reference to the ground, sometimes indicates whether or not the machine is rising and sometimes does not. Another confusing factor is the great variation in the results produced by a given movement of the controls at low and high speed. At high speed a movement of half an inch is sufficient to effect materially the angle of the plane, while at low speed a movement of inches will often produce little result.

When the controls are considered from the psychological standpoint, it is found that no one can fly an airplane safely by the use of conscious mind and reason. He has to trust to instinct on each necessary move, this might be possible, but the nerves are too complicated and the controls are too complicated for this. The fear is found to come on as he is piloted and "test," qualities that are acquired only after much practice. Some people never acquire this ability although they are wise and good pilots. Caution would be entirely sufficient, however, if the movement of the controls produced a positive action, the movement of the stick to the right producing, as in an automobile, a turn to the right. This turn would not be confined to a constant rate, with a proportional increase in the degree of deflection, but the turn would be held back. If this were so, conscious mind and reason would be back of control and "test," and it would not only be easier to learn to fly, but one could be trained, the pilot could work out slowly to have an accident.

Need For "Direct Action" Control

The present form of controls has become complicated as the result of much experience, and it is in no way logical that it is accepted without question as the only possible type. So long as the present form of controls is accepted, it will be done by action rather, which is acquired through training. The ideal controls, however, would be so simple and direct in their action that anyone with normal intelligence could safely fly an airplane before he had learned his reflex action is most characteristic conditions. If this were the case, then it is little doubt that the number of men and women who would take up flying would be greatly increased. For the expert aviator, professional pilot who runs constantly, the present controls are entirely satisfactory. They give the necessary control and action in an act to change them. It is in the question of selection to a more popular field and its initial growth by the general public is complicated that the need of studying controls with a view to simplifying them becomes necessary.

It is obvious, from the standpoint of steering, that the control board of an automobile and rudder, and to some extent the elevator, with a combination which is unworkable in its starting. The rudder bar works in the reverse sense from the steering gear of an automobile, and its use is not natural

The Pennsylvania Air Law

Proposers Call It A Model to be Followed By Other States

IN THE March 11 issue of *Aviation*, there appeared a summary of the legislation which that issue introduced into the Pennsylvania State Legislature by Hon. Edward J. Turner of Chester, Pa. Mr. Turner has written a letter to *Aviation* which is so interesting and which states the case for State regulation so clearly that we are making it available to those who wish to differ with Turner regarding the policy on aviation legislation. Another letter from Robinson V. Taylor, who has Chairman of the Pennsylvania Aeronautics Commission, has accompanied the National Air News last Feb. is also provided—Editor.

From Hon. E. J. Turner

"I have before me a copy of a letter in reference to the Pennsylvania bill placing in the Department of Internal Affairs the power of regulating and licensing aeronauts and creating a commission. I have also seen other correspondence in reference to this matter, and as I am the author of these bills, I feel that I should reply directly.

"I have some knowledge of your experience and know the respect in which your opinion is held by many of the people interested in aviation, but I do not feel that you have given the Legislature nor the situation as we see it, the correct consideration which should have been given before you make such broad statements in criticism.

"In the first place, the bill was prepared in consultation with a representative of the Department of Commerce. I was in constant contact with the Department and with the opinion that the bill which was prepared in Pennsylvania was correct and was legislation. I have then written to Mr. MacCroskey in reference to this article and he has forwarded me a copy of a letter which he has sent you. This is a very different bill from the one which he believed it would be for Legislators to wait another year.

"If we had attempted to inaugurate a lot of restrictive laws such as contained in the District Area Act (which I intended to request that the Federal Government to leave in Congress), then I think you would have some reason to complain.

"Let me answer your statement as I see it:

"First—The bill provides that our rules and regulations shall be in conformity with the Federal rules and regulations. Therefore, any legislation in this field, rules and regulations, etc.

"Second—The Federal Government has so far permitted the field that there are only certain things that we can do, to wit, regulate and license airports and landing fields, maintain and open airports to aircraft flying. As the act provides that a Federal license shall govern within the state and there can be no conflict there.

"Third—As far as a safety measure, and as a license may be procured from the Federal Government without cost, it is not likely that we will have any legislation in this respect.

"Fourth—Every man who has talked in reference to aviation services me that airports and landing fields are necessary for the advancement of aviation. Obviously these cannot be built by private enterprise (except in rare instances) under present conditions. There are few municipalities which have the financial means to develop airports with the necessary equipment and facilities.

"I have therefore, come to the conclusion that either the Federal Government or the State will have to underwrite this work. For many reasons it will be obvious that it will never thus State be a State effort. In other words, the airport is to the airports what good roads are to the automobile.

"With this in view, it becomes valuable to plan and plan ahead, and in the State such a commission as we have created will be in a position to do this.

"Fifth—The commission will likewise be able to cooperate with the Federal authorities, to promulgate such legislation as may in the future be deemed necessary and will be a strong defense against unnecessary and harmful legislation. Experience in every other line of activity shows that when it is new, certain steps leading which in the end come to have upon it a flood of legislation that is harmful. Perhaps with a little foresight and vision we may prevent the arising of the same, and hence save aviation from later restrictive legislation.

"I believe that when you have studied the bill and have given it careful consideration you will see that what we have attempted here in Pennsylvania is helpful and that if it can induce the other States to introduce similar provisions, it will be, as Mr. Taylor says, 'A Model Air Bill.' I am afraid that none of the friends of aviation have given their advice so freely free spend any legislation that they have submitted their view point. This is illustrated by your statement.

"I find that few any state and did not happen to know all the state regulations he would be subject to a fine, etc. In the first place I do not believe that he would meet either provisions, and in the second place the Federal Government has promulgated all police powers, and in the last instance, our act provides that the rules and regulations must conform with the Federal and therefore cannot conflict.

"I am certain that our bill will be passed freely and signed by the Governor and therefore, because the law of Pennsylvania. I am just as certain that it will prove to be of benefit to aviation. It seems to me the thing for aviation to do is to get behind the Pennsylvania Act and try to get it adopted in the other states."

From Robinson V. Taylor

"I have read with much interest your article on page 676 of the March 21st issue of *Aviation* entitled 'A Typical Air Bill.' I should like to express my sincere appreciation of the points made in your review of this bill with the object of getting you our side of the question and in the hope that you may possibly be converted to it. I shall follow these points carefully, considering them for comment."

"It is the kind of legislation that Assistant Secretary Wm. P. MacCroskey, Jr. has tried to hold over for a year before that consideration."

"The Pennsylvania bill was drawn up in conference with Secretary MacCroskey's staff. The bill was largely drawn up by his office."

"If this bill is read with the idea in mind of a similar act being passed by every one of the forty-eight states, the chaotic condition that will result may be imagined."

"On the contrary, similar action would make for uniformity, not for chaos."

"Such uniformity could make and enforce its own regulations, giving forty-eight different possible combinations of rules in the same general aviation situation and others interested in the development of aeronautics and others interested in the development of aeronautics, to guide and control the legislation authorizing those Boards of control, and to take these provisions into account rather than to state that it was for the purpose of the recommended aviation given as fact as we hope it will, then

we should be forbidden in setting up state legislation to protect it from the kind of thoughtless, ill-considered regulations with which it properly appears to be confronted."

"They would deny or mislead license as they see fit."

"The qualifications of drivers and the regulations of auto-licensing could be fixed by the municipalities."

"The above statements apply only to interstate aviation. If the state regulations are more severe than the Federal ones, the operators of aircraft can avoid them by taking out Federal registration."

"No landing field could be established without the consent and honor of the community."

"The Pennsylvania bill has been changed in this respect and now provides that only unimproved fields shall come under state restriction. Privately owned fields are exempt and, of course, Government owned fields."

"The expense to each state for carrying out such legislation will become apparent when the personnel required to carry their provisions into effect are estimated."

"In our opinion, there are not likely to be any great number of applicants for state aviation. Few pilots are willing to be limited in their activities by the boundaries of the state. The few for registration, license, etc. would in any case, however, be examined."

"The commission would also collect and disseminate information, etc."

"The provision of the bill follows the Federal statute as a model."

"If a pilot flew over any state and did not happen to know all of the state regulations he would be subject to a fine, etc."

"All the more reason for uniform state regulations conforming to the Federal one. Safety to the public, protection to a new industry, and control of a new means of transportation in essential segments of such public interest that legislation is bound to be introduced in the situation given and developed."

"It is our belief that the present wide open gap in the law for promoting aviation fields, by which an operator having such responsibility is able to operate within the boundaries of the state without means of identification and control of any kind, should be closed by proper legislation, clearly modeled after the Federal statute and promulgated by the friends of aviation."

"This is the spirit that has actuated us in preparing the Pennsylvania bill and while it may not prove to be perfect, nevertheless, it is a step in the right direction, and that it should be adopted in its present publication as 'A Model State Air Bill,' rather than otherwise as you have seen."

Dayton Wheels on Pan-American Planes

The Dayton Wheel Company, of Dayton, Ohio, began the manufacture of airplane wheels with the entrance of the United States into the World War, and since that time have been making it a specialty with the Bureau of Aeronautics at McCook Field in the development of standard airplane wheels, which have been adopted by both the Army and the Navy.

The Dayton also wheels are now being used on a large percentage of all airplanes used on Government service. The planes used in the Coast to Coast, New York Flight, the Davis to New York Flight and the Round-the-World Flight were equipped with these wheels.

The Landing Amphibian planes, which are now being used in the Pan-American flights are equipped with Dayton wheel wheels.

These wheels were also used on the private Harding-Bowman One of the latest airplane wheels over half were furnished to McCook Field by the Dayton Wheel Company. In discussion with the 1st and it was for the purpose of the proposed. This wheel withstood a breaking test of 64,000 lb.

Kawneer Aircraft Parts

During the World War the Kawneer Company, of Niles, Mich., began the manufacture of metal aircraft parts for engines, such as radials, pistons, fly, distributors, and



The plant and stores of the Kawneer Co. at Niles, Mich.

valves, tank tubing and metal landing parts. Continuously since that time this company has been active in this field, making a specialty of streamlining metal tubes for all aircraft structural purposes. The Kawneer plant covers a four acre of 241,000 sq. ft., located entirely in the manufacture and development of these below metal products.

Direct Measurement of Engine Power

Report No. 885, referring the direct measurement of engine power on an airplane in flight, with a ball type dynamometer, was issued by the National Advisory Committee for Aeronautics, Research Unit made in the Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics to obtain direct measurements of engine power in flight. Tests were made with a Bendiscope ball dynamometer installed on a modified DH-4 airplane, Liberty 22 engine, to determine the suitability of this airplane.

The dynamometer unit, which was designed especially for use with a Liberty 22 engine, is a special propeller hub in which is incorporated a system of pistons and cylinders which transmit between the propeller and the engine crank shaft. No linkages and thrust devices are between the propeller and the engine, which are connected by mechanisms in the cockpit.

These tests have shown the suitability of this type of ball dynamometer for measurement of power in flight and for the determination of the torque and power coefficients of the propeller.

Report No. 885 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

Embry-Riddle's Wide Advertising Campaign

Advertisers' eyes are being opened significantly to the possibilities and advantages of air transport and aerial services. The Embry-Riddle Co. is conducting an intensive advertising campaign throughout the city, utility newspapers, street car cards and billboards. Some of the most prominent billboards in the city have been obtained. Various billboards are especially selected locations are featuring the Embry-Riddle flying school. Street car cards have been run for several weeks, the first four weeks having been given out in monthly hand-out cards featuring station marks and signs such as "no question but what you can't get a high flying year" etc. A second set of colored cards was placed up, and all indications are that the continued advertising is going to put over a most favorable business for Embry-Riddle.

It is believed that the Embry-Riddle Co. is the first aerial service agency in the country to conduct an intensive campaign using newspapers, car cards and billboards. The Embry-Riddle Co. has always carried advertising regularly in the several leading journals, and will continue to do so in even larger units to their activities broaden in scope.

FOREIGN AERONAUTICAL NEWS NOTES

By Special Arrangement with the Automotive and Transportation Divisions,
Bureau of Foreign and Domestic Commerce

Airline From Göteborg to Continent

Extension of air lines connecting Göteborg with the continent is planned for the coming summer. The Swedish Air Lines (A/B Aerotransport) in conjunction with the Deutsche Luftfahrt is to maintain a daily service between Oslo-Göteborg-Copenhagen-Berlin and reverse. Four Starliners, accommodations are maintained with Continental air lines to Berlin, Bremen, Frankfurt and Dresden. Routes are to be opened after one hour's flying from Berlin to Dresden, company 1 in 10 runs, and from Berlin to Bremen, 2 in 30 runs. At Copenhagen, the Swedish line connects with the regular air service KLM-Copenhagen. This traffic is to commence on June 15, 1937, and will continue until Sept. 15, 1937. Dornier-Wal airplanes carrying ten passengers are to be used.

A joint service Helms-Göteborg-Amsterdam is also to be maintained by the A/B Aerotransport in conjunction with the Dutch R. I. M. Co. The joint interests are to open their own office in the central of Keating on Denmark and the previous connection between the Swedish and Dutch air lines are to be discontinued. It is hoped that the Dutch line will open in an extension of the route from Helms to Göteborg, in which case the time of departure from Göteborg has been previously fixed at 7:30 a. m. arriving at Copenhagen at 9:30 a. m. Although this time table is most suitable for passenger traffic, it is unfavorable for the transport of mail, and the A/B Aerotransport therefore propose to maintain a field run from Göteborg to Copenhagen via Helsingborg, an which route mail service is to be used.

Should these plans be realized, a service of not less than three planes daily will connect Göteborg with Copenhagen and the Continent, namely Göteborg-Helsingborg-Copenhagen and Göteborg-Copenhagen-Berlin, both leaving Göteborg in the morning, and Göteborg-Berlin-Copenhagen-Helsingborg-Göteborg in the afternoon. Lead representatives of the A/B Aerotransport state that the results of last year's weather and the increased interest which is being shown for the transport of both goods and passengers by flying machines fully justify the proposed extension, and it is considered that there is every prospect of the venture being successful.

It is also reported that beginning April 18, 1937, a monthly trial will be made of a service line between Göteborg and Stockholm.

Airplane Traffic on Iceland Proposed

Considerable interest has recently been shown in Iceland in a proposed airplane route to cover the entire island. During the summer of 1936 several German aviation experts made a close study of the conditions on Iceland, and their investigation, it is reported, will continue during the coming summer.

One of the leading advocates of air traffic on Iceland is Dr. Alex. Johannesson of Reykjavik, who in a recent statement to the Icelandic press pointed out that regulations have already been taken up with the Luft-Reich of Berlin for the trial flights on the island. The Icelandic Government has not as yet refused its support to the proposed plan but it is thought to be that Iceland will not support until the establishment of an air service would assist materially in improving the efficient and expensive postal service and general communication on the island.

It is planned to inaugurate the service with a small light-ton plane of the combined motor and group type. The initial cost of such a machine would be \$20,000, and the plane

would be able to make a speed of about 150 kph. While this machine daily flights are planned between Reykjavik and the fertile agricultural districts of the southern portion of the island, and other towns on the coast. The plane would also carry mail over the entire country.

According to Dr. Johannesson there is a possibility that light-planes will take the initiative and begin trial flights the coming summer if the necessary financial support is had. If the trials are successful, it is planned to experiment a flying airplane with detachable engine or both German and Icelandic support. The extent of next summer's trials will determine the extent of operations.

Air Tote Mobit Grouping

Imperial Airways, Ltd., has just announced that for the period April 1, 1937, to December 31, 1937 (2 years, 9 months) the mileage flown by the airlines of the company on cross-Channel trips was 2,559,656 mi. During this period 38,329 passengers and 2,117 tons of freight were carried.

In a recent monthly bulletin issued by the Imperial Airways, Ltd., attention is drawn to the fact that the network of air connections, which now link up all of the important cities of Western Europe, enables passengers during the summer season to make extended tours of Europe in a shorter time than has hitherto been possible. The air line habit is growing and by traveling on the regular services, which operate on a fixed time table, the cost of air travel is, in many cases, very little in excess of the cost by rail. An example of such a tour is London-Paris-Basle-Berlin-Lyons-Bordeaux in one day or two days (the last passenger's convenience); Berlin-Basle-Bordeaux one day; London-Basle-Berlin-Lyons-Bordeaux one day; London-Basle-Berlin-Lyons-Bordeaux one day.

It will be seen that similar tour over the route indicated from London to Basle and return can be accomplished in three days. Imperial Airways, Ltd., gives the estimated cost for the tour, exclusive of meals and hotels, as £22 0 0. If it will the traveling time required for the same trip would be approximately four and a half days, and the cost approximately £15 0 0 exclusive of meals and hotels.

British Imports and Exports

The figures for imports, exports and re-exports of surplus, machinery, ballistics and parts thereof of the United Kingdom, for 1935 and 1936, are as follows:

	IMPORTS		EXPORTS		RE-EXPORTS	
	1935	1936	1935	1936	1935	1936
January	5,545	476	10,514	100,749	451	—
February	5,807	5,000	10,474	100,749	451	—
March	—	5,804	10,474	100,749	451	—
April	—	5,804	10,474	100,749	451	—
May	—	5,804	10,474	100,749	451	—
June	—	5,804	10,474	100,749	451	—
July	—	5,804	10,474	100,749	451	—
August	—	5,804	10,474	100,749	451	—
September	—	5,804	10,474	100,749	451	—
October	—	5,804	10,474	100,749	451	—
November	—	5,804	10,474	100,749	451	—
December	—	5,804	10,474	100,749	451	—

1937-1938: 1,111,015 1,111,015 1,111,015 1,111,015 1,111,015 1,111,015

Comparing 1936 with 1935, it is significant that imports have greatly increased and re-exports greatly decreased, exports rising from £24,562 to no less than £74,560, and exports declining from £25,189 to only £22,015. The corresponding figures of the imports and exports, the fact that exports are only shown on a basis, but indicates a decrease of £22,844, or approximately 25% per cent.



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Side Slips

By ROBERT H. GARDNER

The recently established aviation record, set by Messrs. Arnold and Chaudhry in the Bellanca monoplane, seems to have met the aviation industry quite a stupendous map,—that is, made from the money spent by the leaders of the field. Every one we have talked to since the flight seems to have lost anyone from thirty cents to a hundred dollars on bets that the plane wouldn't stay up fifty hours. We haven't found anyone who was anything, as yet, but seem to have probably been a millionaire in those two days.

We hadn't placed any bets on the outcome of the flight, but the extra hour they stayed aloft cost us a dollar and thirty-five cents. While waiting at the field at the end of the flight hour, some one suggested the immense profit of placing bets on a flight. It was a very quiet day and we must have failed to make the proper wind conditions, as most of the circles around the field altogether. If the flight had lasted another hour we might have had to walk home.

Impossible Were Done, Number One—"After the flight, one of the motor manufacturers' engineers suggested the matter. He said that it was in terrible shape and was amazed that it had held together so long."

There is one thing about this flying business to which we can all point with great pride,—the folks engaged in the profession can accomplish great things without thinking that they did it all for "the wife and mother" or for an "aged

mother". Chained wires, championship prize fights and other similar accomplishments seem to be impossible without the inspiration of the aged mother or the wife and mother, but in this business, we are happy to say, a man can do something because he just wants to, or because he'll like to make some money out of it.

Unless this aviation record can be broken before the first of July, we are sure it will stand for all time, as far as American civil aviation is concerned. With our engine horsepower increasing constantly, a plane may be lucky to stagger off with the weight of its frame tags,—not to mention any extra gas for duration flights. The T. A. I. might consider the combining of duration records for planes having between 1 to 14,000, 14,000 to 500,000 and so on, in order to make the competition more even.

A Providence has invented a device with which a pilot may light fuselage lanterns which he wishes to put up at night by questioning a radio machine carried in the plane. If a small station of this apparatus could be made due use in the home, we think the inventor could be assured of large sales. We know a few who make regular landings at night on a river, using only a small light on the end of a pole to guide themselves, and then fall over the same old right in his own home.

WHITE CLOUDS

Across the landing sky they slowly roll,

Like fairy ships upon a sea of light;

And, as I gaze, my heart, without avail,

Yours fervently to listen and pursue.

—Douglas R. Krawtchuk

(Reprinted from the New York Evening Post)

This appears to be a golden opportunity for some one with a soundhead Jersey for sale.

UNITED STATES OF AMERICA
DEPARTMENT OF COMMERCE
BUREAU OF AERONAUTICS

Official No.
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W. P. M. Lusk
Director of Aeronautics

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PUBLISHER'S NEWS LETTER

Eleven years ago, when AVIATION made its bow to the aeronautical world, the first person to read it advertising was Grover Loening. In this issue it is interesting to note that a whole section of the paper is devoted to the products of Loening aeronautics. His influence on the trend of aeronautical development has been marked. His design from Columbia University was the first one awarded for successful success. As general manager of the original Wright Company and as first Chief Aeronautical Engineer of the U. S. Army Air Service, he rightly belongs in the pioneer class of those who have made aircraft history. Today his airplane plans have established for themselves a place that makes them unique. The Goodwill South American Flight has demonstrated the soundness of these and had such an no other task could have done. As a writer and a lecturer, Grover Loening has always regressed advanced ideas. His early advocacy of all metal construction has been demonstrated as sound. His contribution to the engineering advancement of his class will always be recognized.

As an instance of the further outgrowth character of his views, a recent letter will serve admirably. AVIATION has been attempting to draw some of the dangers, if not the fallacy, of having the man of the plume overlook on the idea that absolute safety will come with the use of multi-engine planes. No man values any development that will increase safety of aircraft more than this paper. We believe, however, that for many years the single-engine plane will be used for air traffic and any attempt to create a feeling of danger when using this type of plane should be combated. For the reason, we have pointed from time to time arguments that were intended to offset the plausible argument that three or more engines were necessary, for shows that of the single-engine plane. Mr. Loening entirely shares our views.

He writes:

"After reading your Publisher's News Letter in the April 11th issue, I wish to take this occasion to express to you my appreciation of the very readable manner in which you have called attention to the unwarranted assumption that three-engined airplanes are the 'care-free' air vehicles."

"I have taken occasion to point out in technical articles and lectures, that it is not sound engineering to make the same mistake three times (namely, build your plane on total loss of three engines), on the theory that the chances of consecutive failures will therefore be increased. Obviously, the correct engineering is to correct the fault in the power plant so as to make the single-engine airplane power plant at least as reliable as the automobile is." As

soon as this is done, obviously, the three-engined airplane becomes an awkward, cumbersome, and uneconomical design."

The following letter may give some of the pilots making registration for these planes new information on a controversial point that will bring out more informative facts regarding registration. It is possible that some of the pilots made are not clear and if this is the case the Department of Commerce can be relied on to give an explanation.

"Frequently, some magazines are crossing the information in the minds of the readers that under the new commerce act that all airplanes are going to be registered and no airplane going to be permitted to fly that are not imported and registered and no pilots are going to be permitted to operate same unless first licensed, etc.

"They are all wrong in this and it seems policy to tell you that that article is hurting the industry. There are a lot of owners of TM Scouts, Jennies and Stinsons out the country whose ships are in either dry condition or with a little work can easily be put in serviceable condition who are just not going ahead and doing it because they are used to 'wet and dry.' That attitude you speak of is holding up operations, production and general growth. We know you will be highly glad to make it clear in your columns that the following are facts:

"That only those airplanes will be registered under the commerce act which either are to be engaged in interstate commerce or where the owners apply for registration at some ocean way for the reason of any desire to have their ships registered where they would not be required to under the terms of the commerce act. That pilots are not permitted to be registered as pilots any examination unless they are going to fly planes in interstate commerce or are going to fly some ship that is not required in interstate commerce but is registered under the commerce act.

"It should be made clear in your columns that there is nothing in the terms of the Commerce act that prevents any owner or prospective owner of an airplane from going on and operating an airplane regardless of its condition in carrying passengers, mail or freight or in any other manner operating it so far as the part as long as he complies with his operations within the limits of our state. Nor is there anything which prevents him from flying his unregistered plane for pleasure as a pleasure trip over to any other state or states or country. Furthermore, there is nothing in the Commerce act which makes it necessary for any pilot to register or qualify in order to fly an airplane that is not registered and is not engaged in commerce between different states."

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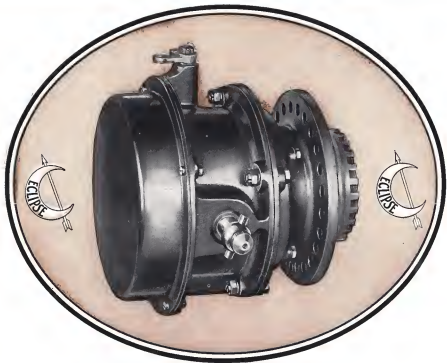
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